

CLAIMS

1. A flow control device, comprising: a flush valve device having a control valve in a path leading from an inflow opening to an outflow opening; a detection portion for outputting presence/absence of a flow of a fluid flowing from the inflow opening to the outflow opening by converting to an electric signal; and a control device for controlling opening and closing of the control valve based on the output of the detection portion,

characterized in that: the flow control device further comprises an electricity generating device for generating electricity by using the flow of the fluid as power; and at least a part of the electricity obtained in the electricity generating device is supplied to the control device.

2. A flow control device according to claim 1, characterized by comprising a capacitor for storing at least a part of the electricity obtained in the electricity generating device.

3. A flow control device according to claim 1 or 2, characterized in that the control device comprises a water leakage monitoring circuit for monitoring a water leakage in the path leading to the outflow opening.

4. A flow control device according to claim 3, characterized

in that:

the control device comprises: a flow rate calculating circuit for calculating a flow rate of a fluid, which is discharged through the outflow opening, based on the electric signal obtained in the detection portion; and a discharge control circuit for closing the control valve in response to information indicating that the flow rate reaches a discharge stop flow rate at which a discharge should be stopped; and

the water leakage monitoring circuit judges an occurrence of the water leakage in response to information indicating that a flow of a fluid is continuously detected in the detection portion after the flow rate reaches the discharge stop flow rate.

5. A flow control device according to claim 3, characterized in that:

the control device comprises: a flow rate calculating circuit for calculating a flow rate of a fluid, which is discharged through the outflow opening, based on the electric signal obtained in the detection portion; and a discharge control circuit for closing the control valve in response to information indicating that the flow rate reaches a discharge stop flow rate at which a discharge should be stopped; and

the water leakage monitoring circuit detects a water leakage in response to information indicating that an electricity generation

is continuously performed in the electricity generating device after the flow rate has reached the discharge stop flow rate.

6. A flow control device according to claim 1, characterized in that:

the control device comprises a detection monitoring circuit for monitoring an operation failure of the detection portion; and

the detection monitoring circuit detects the operation failure of the detection portion in response to information indicating that the electricity generating device is in an electricity generating state and the flow of the fluid is not detected in the detection portion.

7. A flow control device according to claim 1, characterized in that:

the control device comprises an electricity generation monitoring circuit for monitoring an operation failure of the electricity generating device; and

the electricity generation monitoring circuit detects the operation failure of the electricity generating device in response to information indicating that the flow of the fluid is detected in the detection portion and the electricity generating device is not in an electricity generating state.

8. A flow control device according to claim 1, characterized in that:

the path leading from the inflow opening to the outflow opening is composed of a conductive valve housing; and

the control device comprises a theft-prevention circuit, which includes the conductive valve housing as a part of the circuit, for issuing an alert in response to a cut off of the circuit.

9. A flow control device according to claim 1, characterized in that:

the detection portion comprises a rotating impeller, which is arranged in the path leading from the inflow opening to the outflow opening, for rotating when receiving the flow of the fluid; and

the electricity generating device comprises an electricity generating body for rotating with the rotating impeller.

10. A flow control device according to claim 1, characterized in that: the flow control device comprises a plurality of flush valve devices; the flush valve devices include inflow openings connected to a common water supply pipe; and the electricity generating device is provided on the water supply pipe side.

11. A flow control device according to claim 1, characterized in that:

the flow control device comprises a flow rate calculating portion for calculating a flow rate of a fluid, which is discharged through the outflow opening, based on an electric signal obtained in the detection portion;

the control device controls opening and closing of the control valve based on whether or not the flow rate calculated in the flow rate calculating portion reaches a discharge stop flow rate at which a discharge should be stopped; and

the flow control device comprises an output portion for outputting the flow rate calculated in the flow rate calculating portion to an outside of the control portion.

12. A flow control device according to claim 11, characterized in that the output portion comprises a display device for displaying the outputted flow rate.

13. A flow control device according to claim 11, characterized by comprising a storage portion for storing the flow rate to be outputted to the output portion, and a time or date on which a discharge involving the output is performed are stored in correspondence with each other.

14. A flow control device according to claim 11, characterized in that the output portion sums up and outputs flow rates of a fluid

discharged within a unit period.

15. A flow control device according to claim 11, characterized in that the control portion comprises: a flow rate difference calculating circuit for calculating over and short of the calculated flow rate by comparing the calculated flow rate with a predetermined target discharge rate; and an adjustment circuit for adjusting a flow rate to be discharged, based on the flow rate calculated in the flow rate difference calculating circuit.

16. A flow control device according to claim 11, characterized in that the output portion comprises a signal portion for informing that there are over and short in a flow rate of a discharged fluid when there are over and short.